DOCUMENT RESUME

ED 281 094 CG 019 828

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TITLE Validity and Reliability of Revised Inventory of Learning Processes.
PUB DATE 16 Apr 87
NOTE 18p.; Paper presented at the Annual Convention of the Southwestern Psychological Association (33rd, New Orleans, LA, April 16-18, 1987).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Cognitive Processes; *Cognitive Style; College Students; Grade Point Average; Higher Education; Identification; *Learning Processes; *Test Reliability; *Test Validity
IDENTIFIERS Inventory of Learning Processes (Revised)

ABSTRACT

The Inventory of Learning Processes (ILP) was developed by Schmeck, Ribich, and Ramanaiah in 1977 as a self-report inventory to assess learning style through a behavioral-oriented approach. The ILP was revised by Schmeck in 1983. The Revised ILP contains six scales: (1) Deep Processing; (2) Elaborative Processing; (3) Shallow Processing; (4) Self-Efficacy: Conceptualizing; (5) Self-Efficacy: Memorization; and (6) Methodical Study. A study was conducted to examine the validity and reliability of the Revised ILP by correlating test-retest scores on the inventory for each scale and obtaining intercorrelation among the scales on the first administration of the inventory, and by correlating scores on each of the scales in the inventory with psychology course grades and grade point average (GPA). College students (N=110) completed the inventory at 2-week intervals; course grades and GPA's were obtained at the end of the semester. The results showed that deep and shallow processing correlated significantly and inversely and that deep and elaborative processing correlated significantly and positively. Significant correlations were found between Deep Processing, Elaborative Processing, and Self-Efficacy: Conceptualizing scales and course grades and GPA. Shallow Processing, Self-Efficacy: Memorization, and Methodical Study did not correlate significantly with course grades and GPA. Analysis of test-retest scores for men, women, and total groups revealed significant correlations for all but one scale, Self-Efficacy: Conceptualizing, for men. These findings suggest that the Revised ILP can be effective in determining students' learning styles. Future research is warranted. (NB)

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VALIDITY AND RELIABILITY OF REVISED INVENTORY OF LEARNING PROCESSES

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Paper presented at

Southwestern Psychological Association

Thirty-third Annual Convention

held at

New Orleans, Louisiana

CG 019828

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Over the years a number of factors have influenced the research on how human beings learn. In the 1950's, Chomsky's (1951) work in linguistics and Piaget's (1952) theories on human development focused on such thinking. The emergence of electronic computers and the work of Herbert Simon (1078), on artifical intelligence, had a further impact on research of how human beings process information. In the area of human learning and memory, researchers emphasized the importance of processes such as encoding (Melton & Martin, 1972), organization (Tulving & Donaldson, 1972), imagery (Paivio, 1971), and depth of processing (Craik & Tulving, 1975). The need for correlational and experimental research on individual differences in learning was stressed by Cronbach (1957). Some researchers (Cowell & Entwistle, 1971; Cropley & Field, 1968) were successful in using personality, attitudinal and cognitive measures in studying individual differences, but Tallmadge and Shearer (1969, 1971) suggested that learning style might be more useful if assessed

from a behavioral-process orientation. Following the recommendations of Tallmadge and Shearer, Schmeck and his associates (Schmeck, Ribich, & Ramanaiah, 1977) developed a self-report inventory, using the behavioral-oriented approach. The goal for these researchers was to prepare items representing findings and theoretical processes on information processing, especially in the areas of verbal and prose learning. In 1977, these researchers reported five studies they conducted on the development and application of their inventory. Initially, the inventory had 121 true-false items. These items were administered to 503 students and their responses factor analyzed. The result was that 62 items were retained. These items clustered into four groups and were labelled as follows: Deep Processing scale, Elaborative Processing scale, Fact Retention scale, and Methodical Study scale.

Although a great deal of research was done with the original inventory, Schmeck (1983) revised the inventory. The revised inventory (information provided by Schmeck, 1985) was developed by administering the original version of the inventory along with an inventory developed by Entwistle of England. Responses of 500 subjects were factor analyzed and 29 items were selected from Entwistle's inventory and added to the 62 items in the original inventory. The 91-item inventory was then administered to 400 subjects and their responses factor analyzed. Six scales emerged and they were labelled and described (Schmeck, 1985) as follows:

1. Deep Processing (10 items) indicated students who scored

high on the this scale critically evaluate the material they study. They compare and contrast similar ideas and similar presentations of the same idea. They think abstractly, have an interest in category formation and in the properties used to form categories. They do not rely on memorization to pass examinations or excessively "personalize" the information they study. They enjoy theory.

2. Elaborative Processing (10 items) indicated students who earn high scores on this scale are more likely to personalize information, seek personal examples, applications and ways to translate ideas into their own words. They have good visual imagery and believe learning from experiences. At times, they identify issues with themselves to make it more interesting.

3. Shallow Processing (10 items) meaning "literal" or "verbatim" memorization. Students earning high scores on this scale prepare for examinations by trying to remember the information as it appeared in the textbook or lecture notes (it is what multiple-choice tests require). If a high score on this scale is combined with one on Self-Efficacy: Memorization, the student will do well on tests requiring retention of facts and specific pieces of information.

4. Self-Efficacy: Conceptualizing (6 items) students who score high on this scale are confident in their thinking ability. They feel competent to evaluate the merits of an idea or explanation. If a high score on this scale is combined with one on Deep Processing, the student will earn

high grades, especially on essay tests and term papers.

5. Self-Efficacy: Memorization (5 items) students who earn a high score on this scale feel confident with regard to their ability to remember facts and details for examinations. They take pride in having a good memory and earning high grades on objective tests.

6. Methodical Study (6 items) students who score high on this scale invest a lot of time in studying and emphasize study activities that are more formal, systematic, organized, classic, and traditional, e.g., preparing a list of practice questions and sample answers prior to an examination.

On the data collected from the 400 students on the Revised Inventory of Learning Processes, ILP, Schmeck reported (personal information, 1985) the internal consistency reliabilities (Cronback's alpha) and intercorrelations that was done on the six scales. He indicated that further research was needed on the revised inventory.

The purpose of the present investigation was to study the validity and reliabilty of the Revised ILP (Schmeck, 1983) by correlating (a) test-retest scores on the inventory for each scale and obtaining intercorrelation among the scales on the first administration of the inventory, and (b) scores on each of the scales in the inventory with psychology course grades and grade-point averages (GPA), respectively.

The hypotheses were that there would be significant correlations (a) between the test-retest scores of the revised

inventory scales and (significant intercorrelations among the scales similar to those reported by Schmeck, 1985) and (b) between some scores on the inventory scales with the psychology course grades and GPA, respectively.

METHOD

Subjects. There were 125 students (enrolled in seven undergraduate psychology classes) who participated in the study. In this group, there were 40 men and 70 women who provided responses to both test-retest administrations of the inventory. In this group of 110, there were 37 freshmen, 22 sophomores, 19 juniors, 19 seniors, and 13 graduates.

Procedure. Instructors explained the purpose of the study to the students and students who agreed to participate, recorded their responds to the revised inventory on scan-tron sheets. Two weeks later the same inventory was administered to the students. The responses for each student for each administration of the inventory were scored for each of the six scales. These data were entered into the computer. After the semester ended, the course grades and GPA's (obtained from the records office) were entered into the computer.

Intercorrelations for the six scales on the first administration of the inventory were computed and the data compared with those provided by Schmeck in 1985. Pearson-product moment correlations were computed for the total group between (a) scores on the first administration of the inventory and the psychology course grades and GPA, respectively, and (b) scores on test-retest for each scale of the inventory for men, women

and total groups. In addition, analyses of variance were computed for college status and men and women groups on each of the scales in the inventory.

RESULTS AND DISCUSSION

Comparisons of reliabilities, means, standard deviations, and intercorrelations among the scales of the Revised ILP for this study and Schmeck's (1985) study are presented in Table 1.

Insert Table 1

Reliabilities for the inventory in this study were done by correlating test-retest scores for 110 students. Schmeck computed the internal consistency reliabilities (Cronbach alpha) for the 400 students. The intercorrelations for this study, the means and standard deviations (reported in Table 1) were computed on the first administartion of the inventory for 125 students. Schmeck's data are reported in parentheses in Table 1. On a whole, the data for the two studies are similar: deep and shallow processing correlated significantly and inversely and deep and elaborative processing correlated significantly and positively (refer to Table 1).

Pearson-product moment correlations between scores on the inventory scales and psychology course grades and GPA, respectively, for the total group are summarized in Table 2.

Insert Table 2

Significant (and low) correlations ($p < .05$) were found between the Deep Processing, Elaborative Processing, and Self-Efficacy: Conceptualizing scales and course grades and GPA, respectively. Whereas, Shallow Processing, Self-Efficacy: Memorization, and Methodical Study scales did not correlate significantly with course grades and GPA. There are a number of factors influencing course grades and GPA's. In the future, it is suggested that some instrument and/or activity measuring deep, shallow, and elaborative processing be used to study the validity of the Revised ILP.

Correlations between test-retest scores on the Revised ILP for men, women, and the total groups are presented in Table 3. The data show that there were significant correlations

Insert Table 3

($p < .05$) for all correlations except for one scale, Self-Efficacy: Conceptualizing for the men. Computing the t-tests for men and women on all the scales of the ILP it was found that the men and women differed on only one scale, Self-Efficacy: Conceptualization (where men had reported higher scores on this scale than did the women).

Analyses of variance were computed for college status groups

on all scales on the first (Table 4) and second (Table 5)

Insert Tables 4 and 5

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administration of the inventory. On the first administration of the inventory significant differences ($p < .05$) were found on the Deep Processing scale between (a) freshmen and juniors and (b) freshmen and graduates. Freshmen reported lower scores in each case.

On the second administration of the inventory, significant differences ($p < .05$) were found on the Deep Processing scale between freshmen and graduates (freshmen resported lower scores) and on the Shallow Processing scale between freshmen and graduates (freshmen reporting higher scores). The F-ratios were significant for Elaborative Processing and Self-Efficacy: Conceptualizing scales but no two groups were significantly different at the .05 level (Refer to Table 5). These data indicate that freshmen, in particular, could profit from a learning strategy training program where they are taught how to process more deeply and elaboratively the information they learn.

The findings in this study show that the Revised ILP can be used as an effective way in determining students' learning styles. However, additional studies should be conducted with the Revised ILP and other instruments measuring deep, shallow, and elaborative processing.

REFERENCES

Chomsky, N. (1951). Syntatic structures. The Hague: Hounton.

Craik, F. I. M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. Journal of Experimental Psychology: General, 104, 268-294.

Cowell, M. D., & Entwistle, N. J. (1971). The relationship between personality, study attitudes, and academic performance in a technical college. British Journal of Educational Psychology, 41, 85-90.

Cronbach, L. J., (1957). The two disciplines of scientific psychology. American Psychologists, 12, 671-684.

Cropley, A. J., & Field, T. W. 1969. Achievement in science and intellectual style. Journal of Applied Psychology, 53, 132-135.

Melton, A. W., & Martin, E. (Eds.). (1972). Coding processes in human memory. Washington, DC: Winston & Sons.

Paivio, A. (1976). Imagery in recall and recognition. In J. Brown (Ed.). Recall and recognition. NY: John Wiley and Sons.

Piaget, J. (1952). The origins of intelligence in children. NY: International Universities Press.

Schmeck, R. R. (1983). Learning styles of college students. In R. Dillon and R. Schmeck (Eds.). Individual differences in cognition. Vol.1, NY: Academic Press.

Schmeck, R. R. (1985). Revised Inventory Learning Processes. Material sent to the first investigator.

Schmeck, R. R., Ribich, F. D., & Ramanaiah, N. V. (1977). Development of a self-report inventory for assessing individual differences in learning processes. Applied Psychological Measurement, 1, 413-431.

Simon, H. A. (1978). Information-processing theory of human problem solving. In W. K. Estes (Ed.), Handbook of learning and cognitive processes. Hillsdale, NJ: Lawrence Erlbaum Associates.

Tallmadge, G. K., & Shearer, J. W. (1969). Interactive relationship among learner characteristics, types of learning, instructional methods and subject matter variables. Journal of Educational Psychology, 62, 31-38.

Tallamadge, G. K., & Shearer, J. W. (1971). Relationships among learning styles, instructional methods, and the nature of learning experiences. Journal of Educational Psychology, 60, 222-230.

Tulving, E., & Donaldson, W. (Eds.). (1972). Organization of memory, NY: Academic Press.

REVISED INVENTORY OF LEARNING PROCESS (SCHMECK, 1983)

SCALE DESCRIPTIONS

1. Deep Processing - students with high scores critical evaluate material. They compare and contrast ideas. Think abstractly and for categories. They enjoy theory.

2. Shallow Processing - "literal" or "verbatim" memorization. Students with high scores try to remember information as it appeared in the textbook or lecture notes. If a high score here is combined with one on Self-Efficacy: Memorization, student does well in test of retention of facts and specific ideas.

3. Elaborative Processing - students with high scores personalize information, find personal examples, translate ideas into their own words. They have good imagery and believe in learning from experiences.

4. Self-Efficacy: Conceptualizing - students with scores have confidence in their thinking ability, feel competent to evaluate an idea. A high score here combined with Deep Processing, student will earn high grades on essay and term papers.

5. Self-Efficacy: Memorization - high scores here indicate student feels confident in ability to remember facts and details and takes pride in scoring high on objective tests.

6. Methodical Study - student with high scores invest a lot of time in studying and emphasizes study activities which are formed, systematic, traditional e.g. studying for specific questions prior to an exam.

Table 1

Comparison of Reliabilities, Means, Standard Diveations, and Intercorrelations among Scales of the Revised Inventory of Learning Processes for Two Studies[1]

	Scale	Reliab.[2]	M[3]	SD.[3]	Intercorrelations[3]					
					1	2	3	4	5	6
1.	Deep P.	.68 (.73)	4.70 (5.64)	2.54 (2.59)	- -					
2.	Shal P.	.70 (.66)	6.27 (6.03)	2.22 (2.27)	-.36 (-.37)	-				
3.	Elab. P	.48 (.72)	7.29 (7.22)	2.65 (2.30)	.30 (.55)	-.28 (-.27)	-			
4.	Self-E.C.	.56 (.65)	3.61 (3.94)	1.70 (1.72)	.37 (.51)	-.38 (-.34)	.44 (.43)	-		
5.	Self-E.M.	.70 (.70)	3.10 (3.56)	1.51 (1.46)	.20 (.13)	-.08 (.06)	-.11 (.07)	-.29 (.18)	-	
6.	Meth S.	.49 (.60)	2.58 (1.97)	1.49 (1.55)	.11 (.20)	.07 (-.03)	.22 (.11)	.14 (.00)	.17 (.01)	- -

Note: Scales 1. Deep P. = Deep Processing, 2. Shal. P. = Shallow Processing, 3. Elab P. = Elaborative Processing, 4. Self-E.C. = Self Efficacy: Conceptualization, 5. Self E.M. = Self Efficacy: Memorization, 6. Meth. S. = Methodical Study.

1. Two studies: Data from this study and data from Schmeck's (1983) study.

2. Reliabilities: This study used test-retest analysis with 110 students. Schmeck used Cronbach's alpha used with 400 students reported in parenthesis.

3. Means, Standard Deviations, and Intercorrelations: This study used first administration of the inventory which included 125 subjects. Schmeck's study included 400 subjects reported in parenthesis.

TABLE 2

Pearson Product moment Correlations Between Scales of Revised ILP and Psychology Course Grades and GPA for 121 Students.

Scales	Course Grade	GPA
1. Deep Processing	.27*	.22*
2. Shallow Processing	-.09	-.15
3. Elaborative Processing	.33*	.32*
4. Self-Efficacy: Conceptualizing	.34*	.35*
5. Self-Efficacy: Memorization	.14	.10
6. Methodical Study	.14	.11

* $p < .05$

TABLE 3

Pearson Product Moment Correlations, Test-Retest of Revised ILP Scales for Men, Women and Total Groups.

Scales	Groups		
	Men N=40	Women N=70	Total N=110
1. Deep Processing	.66*	.71*	.68*
2. Shallow Processing	.76*	.68*	.70*
3. Elaborative Processing	.64*	.36*	.48*
4. Self-Efficacy: Conceptualizing	.40	.60*	.56*
5. Self-Efficacy: Memorization	.71*	.71*	.70*
6. Methodical Study	.58*	.44*	.49*

*$p < .05$

TABLE 4

Means, Standard Deviations and F-ratios for College Status Groups on Scales of Revised ILP (N=125) (1st Test).

Scale	Group	N	M	SD	F-ratio
1. Deep Processing	Freshman	38	3.18	2.08	6.99*
	Sophomore	23	5.00	2.24	
	Junior	20	5.40	2.30	
	Senior	20	4.75	2.55	
	Graduate	24	6.17	2.58	
2. Shallow Processing	Freshman	38	6.47	2.02	2.11
	Sophomore	23	6.61	2.15	
	Junior	20	6.25	2.15	
	Senior	20	6.85	1.99	
	Graduate	24	5.17	2.60	
3. Elaborative Processing	Freshman	38	6.47	3.17	1.72
	Sophomore	23	7.61	2.55	
	Junior	20	8.15	2.21	
	Senior	20	7.10	2.63	
	Graduate	24	7.70	1.92	
4. Self-Efficacy: Conceptualizing	Freshman	38	3.13	1.63	2.23
	Sophomore	23	4.09	1.65	
	Junior	20	3.70	1.81	
	Senior	20	3.20	1.82	
	Graduate	24	4.17	1.49	
5. Self-Efficacy: Memorization	Freshman	38	2.97	1.46	1.00
	Sophomore	23	3.39	1.40	
	Junior	20	2.60	1.64	
	Senior	20	3.20	1.61	
	Graduate	24	3.33	1.46	
6. Methodical Study	Freshman	38	2.47	1.45	0.22
	Sophomore	23	2.47	1.59	
	Junior	20	2.80	1.64	
	Senior	20	2.70	1.17	
	Graduate	24	2.54	1.64	

Note: on Deep Processing Scale post-t tests showed significance differences (a) Freshman and Juniors, and (b) Freshman and Graduates.

* $p < .05$

TABLE 5

Means, Standard Deviations and F-ratio for College Status Groups on Scales on Revised ILP (N=110) 2nd Testing.

Scale	Group	N	M	SD	F-ratio
1. Deep Processing	Freshman	37	3.70	2.49	3.60*[1]
	Sophomore	22	5.09	2.79	
	Junior	19	4.89	2.58	
	Senior	19	4.53	2.87	
	Graduate	13	6.85	2.64	
2. Shallow Processing	Freshman	37	7.38	1.79	3.25*[2]
	Sophomore	22	7.14	1.98	
	Junior	19	6.68	2.24	
	Senior	19	6.74	2.58	
	Graduate	13.	4.92	2.66	
3. Elaborative Processing	Freshman	37	5.54	2.71	3.52*[3]
	Sophomore	22	7.36	2.11	
	Junior	19	7.37	2.17	
	Senior	19	6.84	2.43	
	Graduate	13	7.69	2.14	
4. Self-Efficacy:	Freshman	37	3.00	1.67	2.52*[4]
	Sophomore	22	4.05	1.89	
	Junior	19	4.26	1.69	
	Senior	19	3.95	2.07	
	Graduate	13	4.23	1.42	
5. Self-Efficacy: Memorization	Freshman	37	3.14	1.49	0.61
	Sophomore	22	3.45	1.50	
	Junior	19	3.00	1.60	
	Senior	19	3.05	1.62	
	Graduate	13	3.69	1.60	
6. Methodical Study	Freshman	37	2.51	1.26	0.31
	Sophomore	22	2.64	1.65	
	Junior	19	2.21	1.69	
	Senior	19	2.42	1.17	
	Graduate	13	2.69	1.55	

Note: *1 Deep Processing Scale, post-t tests showed significant differences between Freshman and Graduates.
*2 Shallow Processing Scale, post-t tests showed significant differences between Freshman (higher scores) and Graduates.
*3 Elaborative Processing Scale, no two groups were significantly different at .05 level.
*4 Self-Efficacy Conceptualization, no two groups were significantly different at .05 level.

* $f < .05$